

William Ludlow, U.S.A., August 30, 1901, Washington.

Waldron Shapleigh, August 30, 1901, Philadelphia.

Pascual de Guyangos, October 4, 1897, London, Eng.

Papers were read as follows :

“ On Friedrich Nietzsche,” by A. Radcliffe Grote.

“ On the Gundungurra Language,” by R. H. Mathews.

“ Notes on Pure Circulating Decimals,” by C. M. Fennell.

The Society was adjourned by the presiding officer.

THE GUNDUNGURRA LANGUAGE.

BY R. H. MATHEWS, L.S.

(*Read October 4, 1901.*)

The Dhar'rook and Gun'dungur'ra tribes respectively occupied the country from the mouth of the Hawkesbury river to Mount Victoria, and thence southerly to Berrima and Goulburn, New South Wales. On the south and southeast they were joined by the Thurralwal, whose language has the same structure, although differing in vocabulary.

Besides the verbs and pronouns, many of the nouns, adjectives, prepositions and adverbs are subject to inflection for number and person. Similar inflections have, to some extent, been observed in certain islands of the Pacific Ocean, but have not hitherto been reported in Australia. I have also discovered two forms of the dual and plural of the first personal pronoun, a specialty which has likewise been found in Polynesian and North American dialects. Traces of a double dual were noticed by Mr. Threlkeld at Lake Macquarie, New South Wales, and traces of a double plural by Mr. Tuckfield in the Geelong tribe; but the prevalence of both forms of the dual and plural in different parts of speech in any Australian language has, up to the present, escaped observation.

ORTHOGRAPHY.

Nineteen letters of the English alphabet are sounded, comprising fourteen consonants—b, d, g, h, j, k, l, m, n, p, r, t, w, y—and five vowels—a, e, i, o, u. Every word is spelled phonetically, the letters

having the same value as in English, with the following qualifications :

Unmarked vowels have the usual short sound.

Vowels having the long sound are distinguished by the following marks :

ā as in fate	ī as in pie	oo as in moon
â as in father	ô as in pole	ee as in feel
	ou as in loud	

It is frequently difficult to distinguish between the short or unmarked sound of a and that of u. A thick or dull sound of i is occasionally met with, which closely approaches the short sound of u or a.

G is hard in every instance.

R has a rough trilled sound, as in hurrah !

Ng at the beginning of a word, as ngee = yes, has a peculiar sound, which can be got very closely by putting oo before it, as oong-ee', and articulating it quickly as one syllable. At the end of a word or syllable it has substantially the sound of ng in our word sing.

The sound of the Spanish ñ is frequent, both at the beginning or end of a syllable.

Y, followed by a vowel, is attached to several consonants, as in dya, dyee, tyoo, etc., and is pronounced therewith in one syllable, the initial sound of the d or other consonant being retained. Y at the beginning of a word or syllable has its usual consonant value.

Dh is pronounced nearly as th in "that" with a slight sound of the d preceding it.

Nh has nearly the sound of th in "that" with an initial sound of the n.

The final h is guttural, resembling ch in the German word "joch."

T is interchangeable with d, p with b, and g with k in most words where these letters are employed.

A sound resembling j is frequently given by the natives, which can be represented by dy or ty; thus, dya or tya has very nearly the same sound as ja.

In all cases where there is a double consonant, each letter is distinctly enunciated.

W always commences a syllable or word and has its ordinary consonant sound in all cases.

At the end of a syllable or word, ty is sounded as one letter; thus, in beety-bal-lee-mañ, it is disappearing, the syllable beety can be obtained by commencing to say "beet-ye," and stopping short without articulating the final e, but including the sound of the y in conjunction with the t—the two letters being pronounced together as one.

ARTICLES.

The equivalents of the English articles, "a" and "the," do not occur in this language.

NOUNS.

Number.—Nouns have the singular, dual and plural :

(1) <i>Singular</i>	A man	Murriñ
<i>Dual</i>	A pair of men	Murriñboolallee
<i>Plural</i>	Several men	Murriñdyargang
(2) <i>Singular</i>	A kangaroo	Booroo
<i>Dual</i>	A pair of kangaroos	Booroolallee
<i>Plural</i>	Several kangaroos	Boorooyargang

It will be observed that the dual and plural suffixes vary slightly in form, according to the termination of the noun.

Gender.—Mur'riñ, a man; bul'lan, a woman; boobal, a boy; mullunga, a girl; goodha, a child of either sex; warrambal, a young man. Another name for a man is boual; a married man is kunbeelang; a married woman is boualillang. Generally the males of animals are distinguished by the addition of goomban, and the females by dhoorook. The males of certain animals have a name which distinguishes them without stating the sex; thus, the male of wallee, the opossum, is known as jerrawul, while the female is wallee dhoorook. Goola, the native bear, has burrandang for the male and goola dhoorook for the female. A few animals have a distinctive word for the female as well as for the male; thus, the female of the wallaroo is bāwa, and the male goondarwā. Others again have the suffix koual for the male, and ñoual for the female. The words for "male" and "female" are inflected for number like other adjectives.

Case.—There are two forms of the nominative, the first naming the subject at rest; as, Boual ngabooramañ, the man sleeps. The

second shows that the subject is doing some act ; thus, mirreegangga wallee burrârañ, the 'dog an opossum bit. Mirreegang is a dog in the first nominative.

The possessive case takes a suffix both to the possessor and that which is possessed :

Murringoo warrangangoong, a man's boomerang.

Mirreengoo goodhâwoong, a dog's puppy.

Bullangoo goodhâyarroong, a woman's children.

Booroongoo dhoombirgoong, a kangaroo's tail.

Any object over which one can exercise ownership can be conjugated by possessive suffixes for number and person :

<i>Singular.</i>	{	First Person . . .	My boomerang	Warrangandya
		Second Person . . .	Thy boomerang	Warranganyee
		Third Person . . .	His boomerang	Warrangangoong
<i>Dual . .</i>	{	First Person . . .	{ Our boomerang, incl.	Warrangangulla
			{ Our boomerang, excl.	Warrangangullang
		Second Person . . .	Your boomerang	Warranganboola
		Third Person . . .	Their boomerang	Warranganboolangoo
<i>Plural .</i>	{	First Person . . .	{ Our boomerang, incl.	Warranganyinnang
			{ Our boomerang, excl.	Warranganyillung
		Second Person . . .	Your boomerang	Warranganyoorung
		Third Person . . .	Their boomerang	Warrangandyunnung

The accusative does not differ from the nominative. There are a few forms of nouns for the dative and oblique, but these cases are frequently shown by modifications of the verb ; as, I carried to him, he carried from me. They are also indicated by the pronouns ; as, with me, to me.

PRONOUNS.

Pronouns are inflected for number, person and case. There are two forms of the dual and plural in the first person. The following table shows the nominative and possessive cases :

<i>Singular.</i>	{	I	Goolangga	Mine	Goolanggooya
		Thou	Goolanjee	Thine	Goolanyingoo
		He	Dhannooladhoo	His	Dhannoooolangoo
<i>Dual . .</i>	{	We, incl.	Goolanga	Ours, incl.	Goolangalja
		We, excl.	Goolangaloong	Ours, excl.	Goolangaloong
		Ye	Goolambo	Yours	Goolambooolong
		They	Dhannooboola	Theirs	Dhannooboolangoo

<i>Plural.</i>	{	We, incl.	Goolanyan	Ours, incl.	Goolanyanning
		We, excl.	Goolanyilla	Ours, excl.	Goolanyillungoon
		Ye	Goolambanoo	Yours	Goolanthooroong
		They	Dhannoojimmalang	Theirs	Goolangandyoolang

These possessives admit of variations to include two or several articles and in other ways. There are also forms of the pronouns signifying, with me, with thee, and so on as follows :

<i>Singular.</i>	{	First Person	With me	Goolangngooreea
		Second Person	With thee	Goolangooroonyee
		Third Person	With him	Goolangooroong
<i>Dual.</i>	{	First Person . . .	{ With us, incl.	Goolangooroongulla
			{ With us, excl.	Goolangooroongullung
		Second Person . . .	With ye	Goolangoorooloong
			Third Person	With them
<i>Plural.</i>	{	First Person . . .	{ With us, incl.	Goolangooroõunnung
			{ With us, excl.	Goolangooroõullungoo
		Second Person . . .	With ye	Goolangooroõooroong
			Third Person	With them

There are other modifications of the pronouns to meet different forms of expression. The demonstratives and interrogatives are inflected for number and person like the rest.

ADJECTIVES.

Adjectives take the same dual and plural numbers as the nouns with which they are used :

- | | |
|-----------------------------------|-----------------------------------|
| (1) Barrī bugarabang | A wallaby, large |
| Barrīwoolallee bugarabangoolallee | A couple of wallabies, both large |
| Barrīdyargang bugarabangargang | Several wallabies, all large |
| (2) Bullan yeddung | A woman pretty |
| Bullanboollee yeddungboollee | A couple of pretty women |
| Bullandhar yeddungdyargang | Several pretty women |

Comparison is effected by saying, This is heavy—that is heavy ; this is smooth—that is not ; this is sharp—that is very sharp.

When used predicatively, as yooroang or yoorwang, he is strong, an adjective can be conjugated through all the tenses and moods of an intransitive verb :

Present Tense.

<i>Singular.</i>	{	First Person . . . I am strong	Yooroangga or Voorwangga
		Second Person . . Thou art strong	Yooroandyee
		Third Person . . . He is strong	Yooroang
<i>Dual.</i> . .	{	First Person . . . { We are strong, incl.	Yooroanga
			{ We are strong, excl.
		Second Person . . Ye are strong	Yooroangboo
Third Person . . . They are strong	Yooroangboola		
<i>Plural.</i> . .	{	First Person . . . { We are strong, incl.	Yooroanyun
			{ We are strong, excl.
		Second Person . . Ye are strong	Yooroanthoo
Third Person . . . They are strong	Yooroanjimalang		

The past and future tenses are not given, owing to want of space.

VERBS.

Verbs have the singular, dual and plural numbers, the usual persons and tenses, and three principal moods, viz., indicative, imperative and conditional. The verb-stem and a contraction of the pronoun are incorporated, and the word thus formed is used in the conjugation.

INDICATIVE MOOD.

Present Tense.

<i>Singular.</i>	{	First Person . . . I throw (throw I)	Yerreemangga
		Second Person . . Thou throwest	Yerreemandyee
		Third Person . . . He throws	Yerreemañ
<i>Dual.</i> . .	{	First Person . . . { We throw, incl.	Yerreemang'a
			{ We throw, excl.
		Second Person . . Ye throw	Yerreemanboo
Third Person . . . They throw	Yerreemanboola		
<i>Plural.</i> . .	{	First Person . . . { We throw, incl.	Yerreemanyan
			{ We throw, excl.
		Second Person . . Ye throw	Yerreemanthoo
Third Person . . . They throw	Yerreemandyoolung		

Past Tense.

<i>Singular.</i>	{	First Person . . . I threw (threw I)	Yerreering'ga
		Second Person . . Thou threwest	Yerreerindyee
		Third Person . . . He threw	Yerreering

<i>Dual</i> . .	{	First Person . .	{ We threw, incl.	Yerreering'a
			{ We threw, excl.	Yerreeringalooong
		Second Person . .	Ye threw	Yerreeringboo
	{	Third Person . .	They threw	Yerreeringboola
<i>Plural</i> . .	{	First Person . .	{ We threw, incl.	Yerreooranyan
			{ We threw, excl.	Yerreooranyulla
		Second Person . .	Ye threw	Yerreooranthoo
		Third Person . .	They threw	Yerreooradyoolung

Future Tense.

<i>Singular</i> . .	{	First Person . .	I will throw	Yerreeningga
		Second Person . .	Thou wilt throw	Yerreenindyee
		Third Person . .	He will throw	Yerreenifi
<i>Dual</i> . .	{	First Person . .	{ We will throw, incl.	Yerreening'a
			{ We will throw, excl.	Yerreeningalooong
		Second Person . .	Ye will throw	Yerreenimboo
		Third Person . .	They will throw	Yerreenimboola
<i>Plural</i> . .	{	First Person . .	{ We will throw, incl.	Yerreeninyan
			{ We will throw, excl.	Yerreeninyulla
		Second Person . .	Ye will throw	Yerreemunanthoo
		Third Person . .	They will throw	Yerreemunadyoolung

IMPERATIVE MOOD.

<i>Singular</i> . .	Second Person	Throw thou	Yer'-ree
<i>Dual</i>	Second Person	Throw ye	Yer'-ree-ou'
<i>Plural</i>	Second Person	Throw ye	Yer'-ree-a-nhoo'

CONDITIONAL MOOD.

Perhaps I will throw	Yerreeningga	booramboonda
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If a negative meaning be required, it is effected by means of an infix, *mooga*, between the verb-stem and the abbreviated pronoun. One example in the first person singular in each tense will exhibit the negative form of the verb :

I am not throwing	Yerreemoogamangga
I did not throw	Yerreemoogaringga
I will not throw	Yerreemooganingga

This negative infix can be applied in the same manner to all the persons of the three tenses.

There are numerous modifications of the verbal suffixes to convey variations of meaning ; as, " I threw at him," " He threw at

me," etc., which can be conjugated for number and person. Case can also be indicated in this way, as already stated in dealing with the nouns.

Verbs have no passive voice. If a native desires to state that a fish was swallowed by a pelican, he would say, "A pelican swallowed a fish."

PREPOSITIONS.

Some prepositions can be used separately, as *dhooregoong*, between; *warroo*, around; *wilinga*, behind, and several others, thus: *Dhooregoong ngullawoolee*, between trees two or between two trees; *gunbee warroo*, the fire around or around the fire.

A prepositional meaning is often obtained by a verb; thus, instead of having a word for "up" or "down," a native will say, *Boomaningga*, up I will go; *woorâramuningga*, down I will go. Many of the prepositions admit of conjugation for number and person, as in the following example:

<i>Singular.</i>	{	First Person . . . Behind me	<i>Wilingja</i>
		Second Person . . Behind thee	<i>Wilinganyee</i>
		Third Person . . Behind him	<i>Wilingâwoong</i>
<i>Dual.</i>	{	First Person . . { Behind us, incl.	<i>Wilingangulla</i>
		{ Behind us, excl.	<i>Wilingangullung</i>
		Second Person . . Behind ye	<i>Wilingangâwooloong</i>
<i>Plural.</i>	{	Third Person . . Behind them	<i>Wilingangawoolangoo</i>
		First Person . . { Behind us, incl.	<i>Wilinganyanung</i>
		{ Behind us, excl.	<i>Wilinganyanungoo</i>
	{	Second Person . . Behind ye	<i>Wilinganthooroong</i>
		Third Person . . Behind them	<i>Wilingadyanung</i>

ADVERBS.

Space will not permit of a list of adverbs any further than to illustrate how some of them can be conjugated:

<i>Singular.</i>	{	First Person . . . Where go I	<i>Ngoondeeneea</i>
		Second Person . . Where goest thou	<i>Ngoondeeneeëe</i>
		Third Person . . . Where goes he	<i>Ngoondeeneeoong</i>
<i>Dual.</i>	{	First Person . . { Where go we, incl.	<i>Ngoondeeneenga</i>
		{ Where go we, excl.	<i>Ngoondeeneengoolung</i>
		Second Person . . Where go ye	<i>Ngoondeeneewoo</i>
	{	Third Person . . . Where go they	<i>Ngoondeeneewoolu</i>

<i>Plural</i> .	{	First Person . .	{ Where go we, incl.	Ngoondeeneeñun
			{ Where go we, excl.	Ngoondeeneeñulla
		Second Person .	Where go ye	Ngoondeeneeño
		Third Person . .	Where go they	Ngoondeeneeyoolung

Adverbial meanings are sometimes conveyed by means of verbs, as *beetyballeemañ*, he (or it) goes out of sight. Conjunctions and interjections are few and unimportant.

NOTES ON PURE CIRCULATING DECIMALS.

BY C. A. M. FENNELL, CAMBRIDGE, ENGLAND.

(Read October 4, 1901.)

§ 1. The following properties of cyclic periods of decimals are supplementary to those discussed by Prof. Glaisher in the *Proceedings* of the Cambridge Philosophical Society, October 28, 1878, Vol. III, Part v.

§ 2. The following letters, definitions and theorem are taken from p. 185 of Prof. Glaisher's paper. The periods that arise from the series of fractions $\frac{p}{q}, \frac{p}{q}$ being a vulgar fraction in its lowest terms, and p having all values less than q (which is prime to 10), are called the periods of the denominator q , or, more simply, the periods of q . Theorem: the denominator $\varphi(q)$, which includes all the above values of p , has a certain number (n) of periods, each containing the same number (a) of digits, n and a being connected by the relation, $na = \varphi(q)$.

§ 3. (i) The first inquiry relates to the distribution of the several digits, 0, 9, 3, 6, 1, 8, 2, 7, 4, 5, over the n periods of a digits which constitute Prof. Glaisher's $\varphi(q)$. In this particular a difference emerges between 0, 9, 3, 6, and the rest of the digits, the observation of which may prove important to the theory of numbers.

Of course there must always be as many 9s as 0s, 3s as 6s, 1s as 8s, etc., but as verified up to $\frac{1}{401}$ there are the same number, say m , of each of the six digits, 1, 8, 2, 7, 4, 5, m being a positive integer.

E.g., in the single period of $\frac{1}{4}$, viz., .142857, each of the six